"Intranet, Internet, and Cloud Computing: Identifying Weak Spots in Our Technological Infrastructure"

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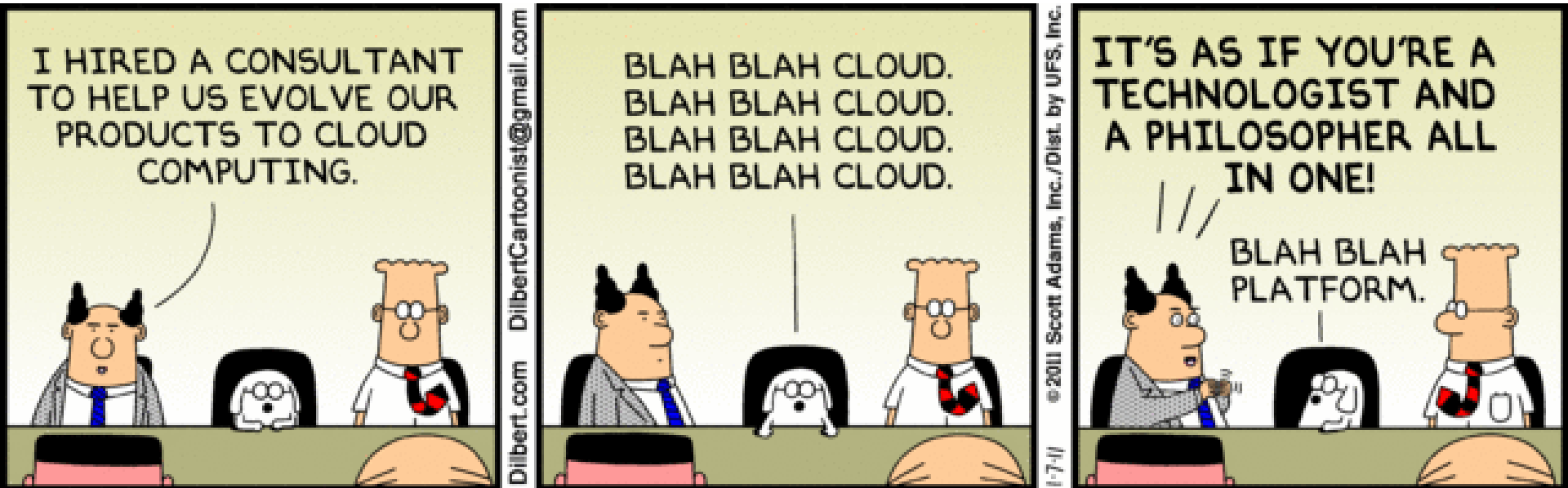

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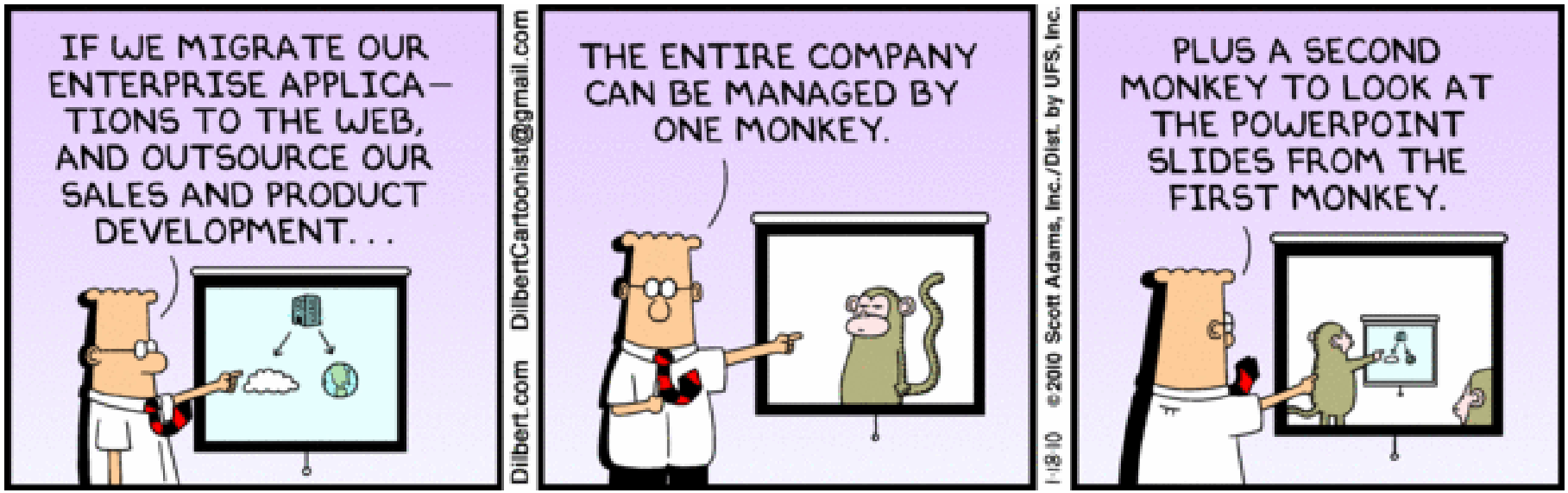
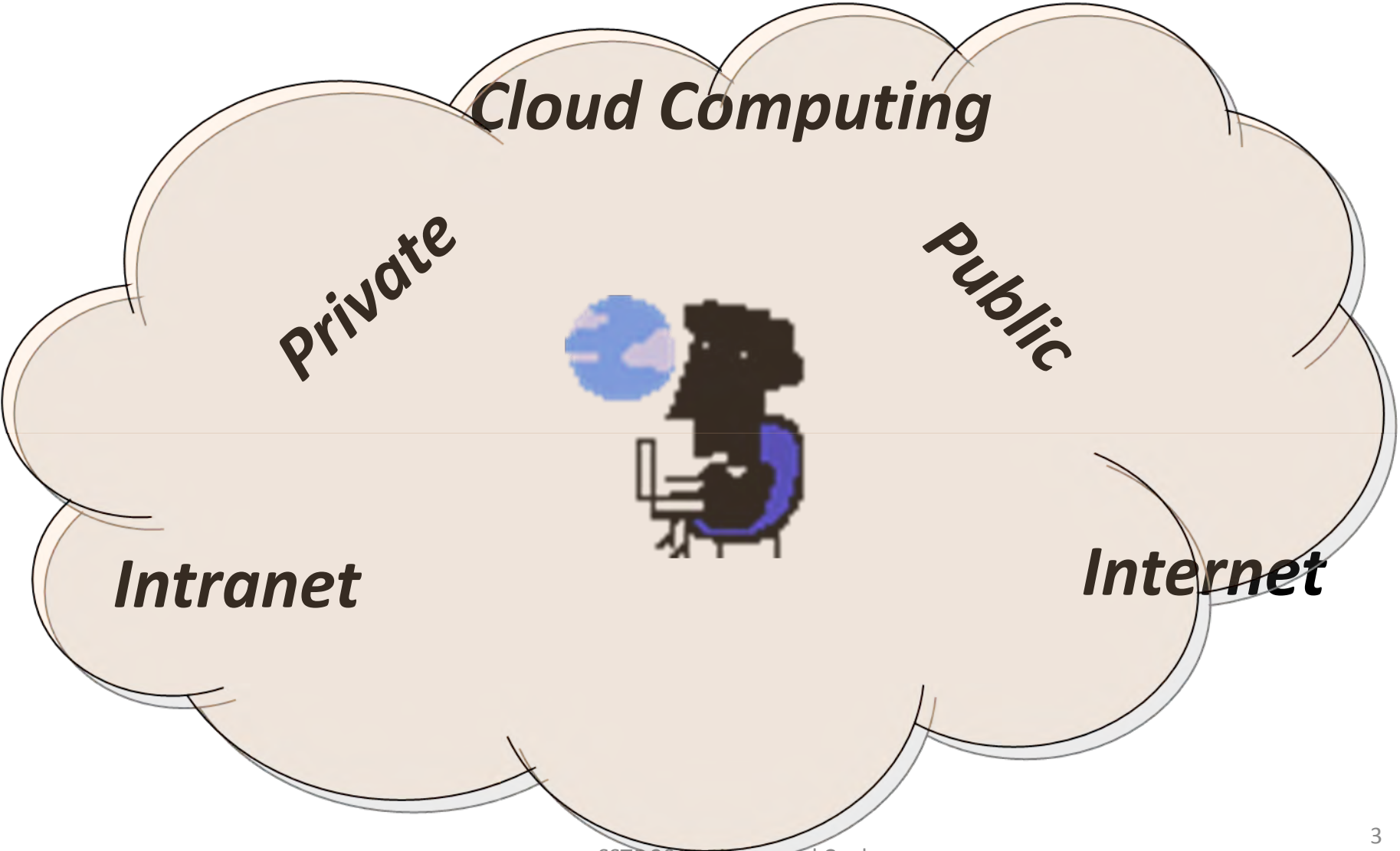
Objectives

- Define the Cloud
- Why Now
- Technological Limitations
- Towards a DoD Cloud



Computing Technological



Define the Cloud

Cloud computing refers to the provision of computational resources on demand via a computer network.

Is the Cloud a Panacea?

Not a Panacea – but a new tool we need in the Bat Utility Belt!

Define the Cloud

National Institute of Standards of Technology (NIST)

NIST five essential characteristics of the cloud are that it offers:

- **On demand self-service** that allows consumers to unilaterally provision computing capabilities without human interaction with the service provider,
- **Broad network access**, meaning that capabilities are available over a network and can be accessed by heterogeneous platforms, i.e., not just a dedicated thin client.

Define the Cloud

National Institute of Standards of Technology (NIST)

(cont)

- **Resource pooling** such that different physical and virtual resources get dynamically assigned and reassigned according to consumer demand in a multi-tenant model.
- **Rapid elasticity** so that to the consumer, available capabilities often appear to be unlimited and can be purchased in any quantity at any time.
- **Measured service** allowing usage it be monitored, controlled and reported and automatically controlled and optimized.

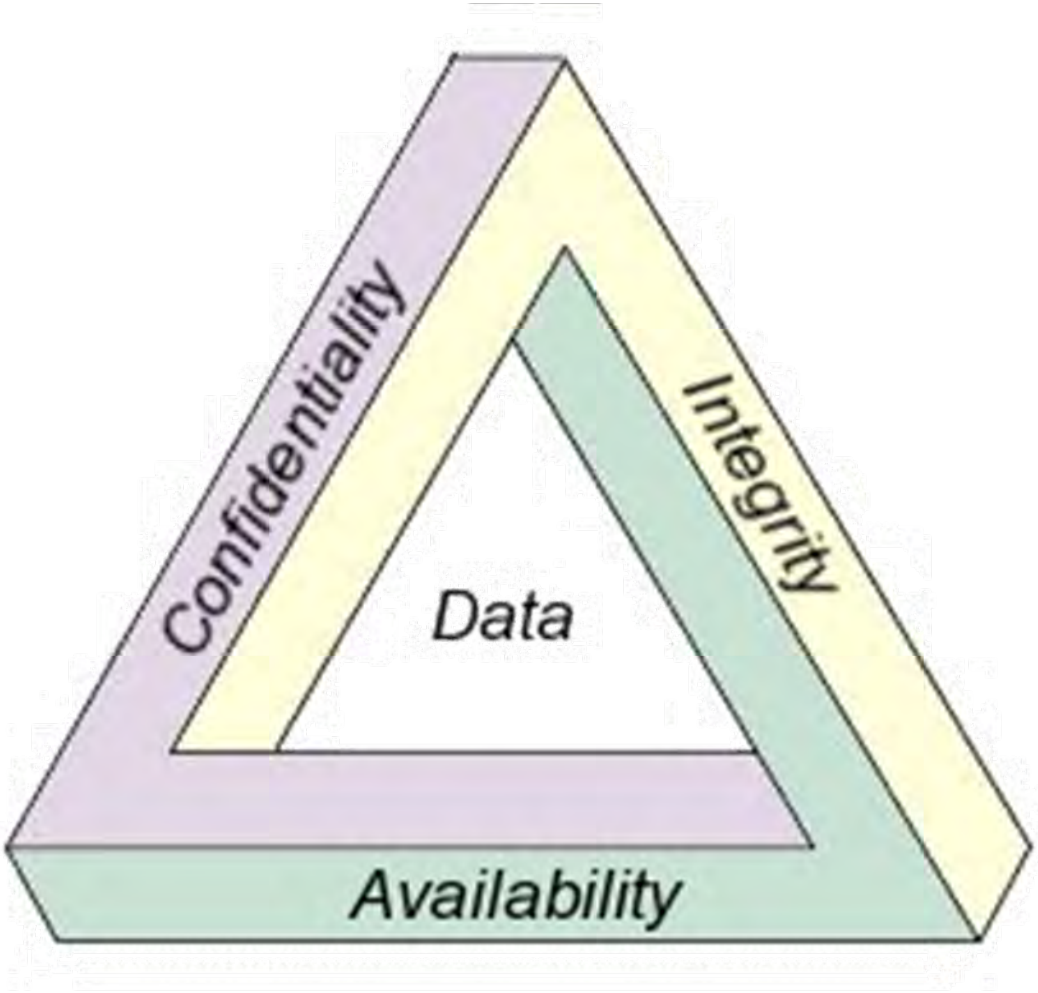
NIST says cloud service models exist in three varieties:

- **Cloud software as a service**, in which applications run on a cloud but user doesn't provision or modify cloud service (or even application capabilities) apart from limited user-specific configuration settings.
- **Cloud platform as a service**, in which users utilize cloud-provided programming tools to deploy applications without controlling most of the underlying infrastructure (possible exception – the application hosting environment configuration)
- **Cloud infrastructure as a service** – might be termed the whole nine yards of cloud computing, except that NIST would never be so colloquial. User has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g., host firewalls) of cloud environment available to the user via the network.

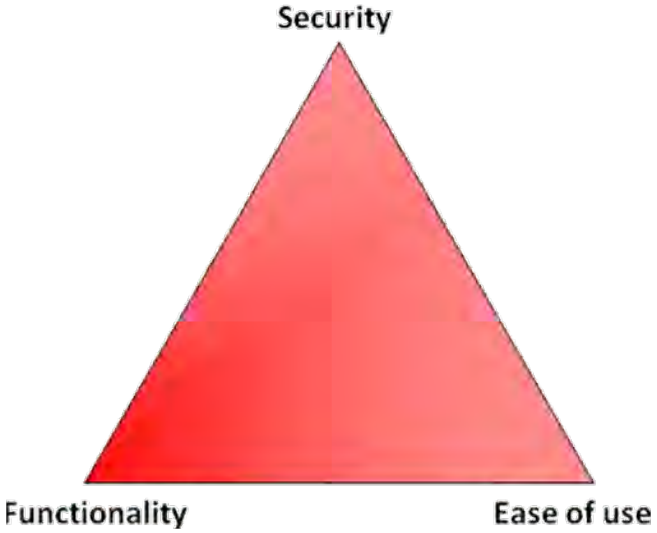
NIST also says there are four deployment models:

- A **private cloud** in which the cloud infrastructure is utilized by just one organization, though not necessarily operated by that one organization.
- A **community cloud** whereby several organizations with common concerns share a cloud.
- The **public cloud** provided by the private sector for all users (NIST doesn't say this, but it seems to believe this consists entirely of Amazon Web Services).
- A **hybrid cloud** in which two or more cloud types are discrete but networked together such that a burst of activity beyond the capabilities of one cloud is shifted for processing to another.

The Cloud must support the Data & Security Triad



From another dimension – adding Usability and InfoSec



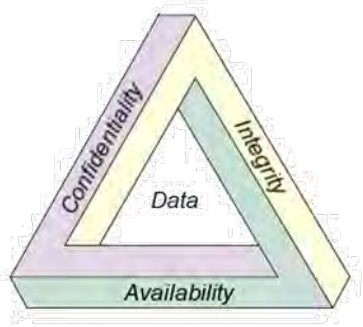
- Data Security is NOT an issue in the cloud UNLESS your IT folks are careless or clueless.
- There are adequate methods to ensure reasonable security, using off-the-shelf encryption/decryption methodology.
- The secret is to do the security at YOUR end, and only trust a private cloud that is under your total control

Availability - Technological Limitations

The Achilles' heel of cloud computing is "the network".

One can easily build a data center with thousands of compute and storage nodes, but when it comes to network it doesn't scale that easily. It is also very costly to provide "always-on", high-bandwidth connection to millions of users accessing the cloud over the Internet.

Pradeep Padala, Researcher, DOCOMO Labs

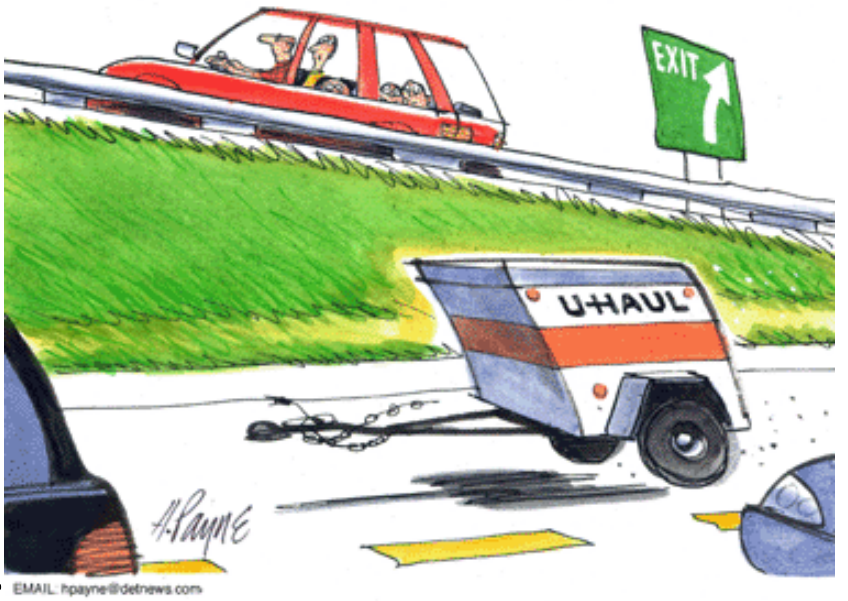


Advantages & Limitations of Cloud Storage

Compared with a local operation, it takes a long time to pull data from the cloud and serve it back to a client.

Cloud data transfer

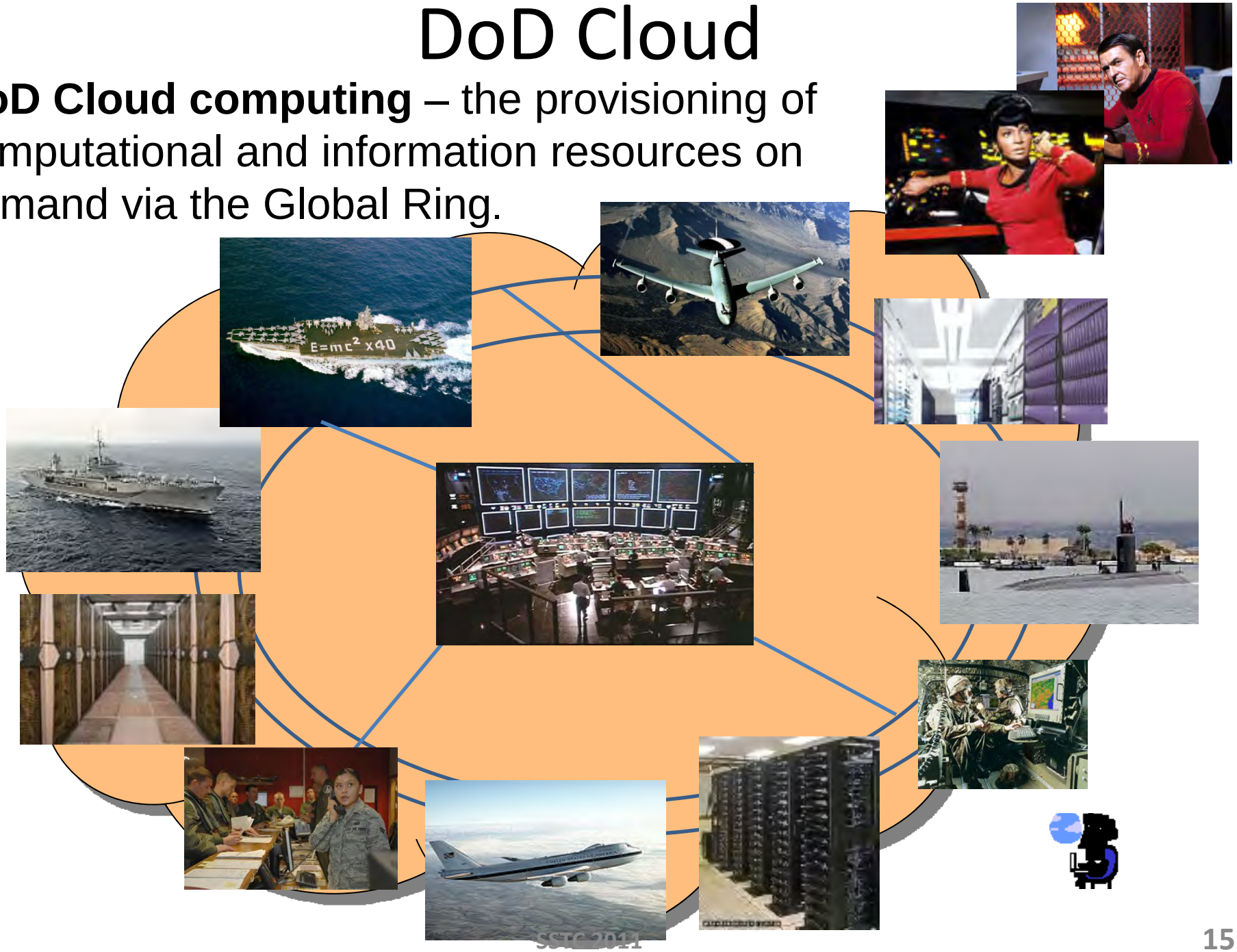
- If you are using many large files, be aware that you will probably have to set "throttle limits" on upload/download, to prevent other users from experiencing network delays



- If the file is a large database (with indexing) – potentially large file segments will need to be local.

DoD Cloud

DoD Cloud computing – the provisioning of computational and information resources on demand via the Global Ring.



Why Now? Because we need it!

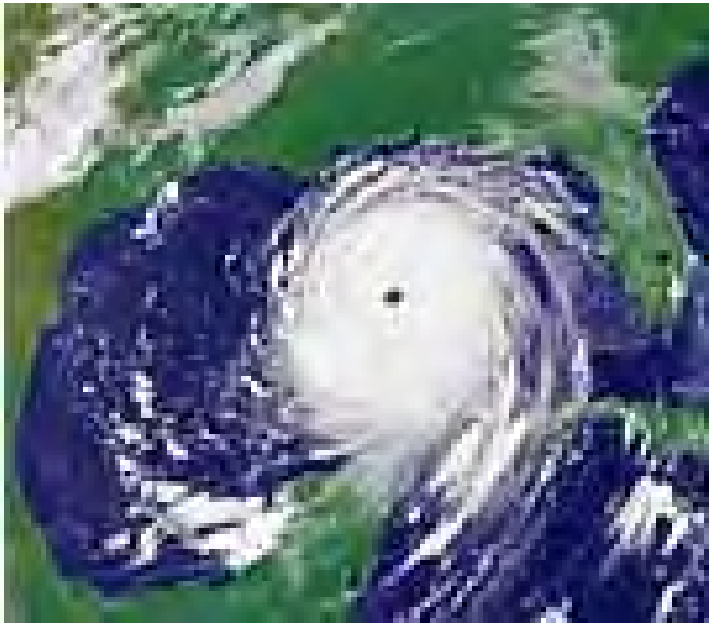
In the past 20 years DoD has had major engagements with Mother Nature – and has always lost!

THE JUNE 1991 ERUPTION OF MOUNT PINATUBO, PHILIPPINES

Why Now? Because we now can!

Hurricane Andrew in August 1992

Hurricane Katrina, Keesler AFB, 2005



Japan's Quake-Tsunami March 2011

Why Now? We need to be PROACTIVE, not REACTIVE!

Japan's Quake-Tsunami March 2011

Enterprise Network have centralized Network management and services.

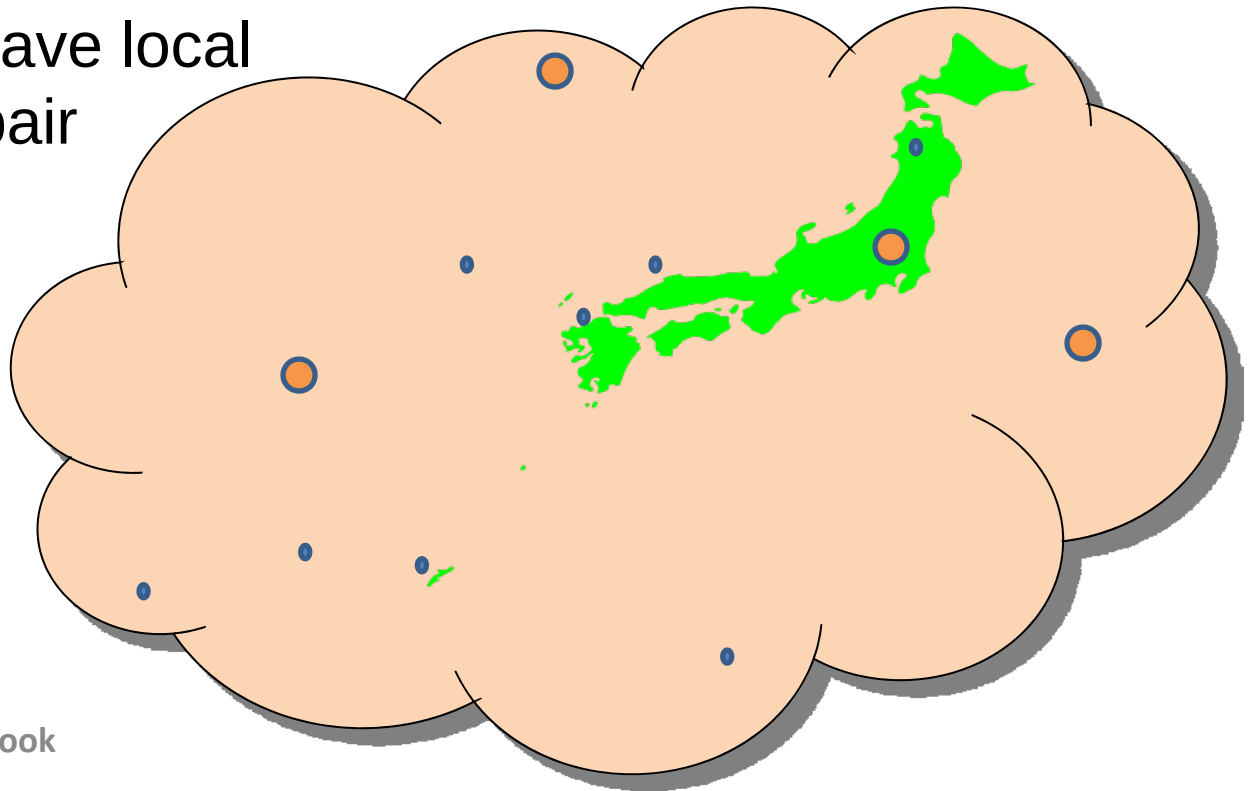
- Reduce operating cost
- Sites only have “touch labor” to repair machines

What happens to the network if we are forced to evacuate the Theater Network Operation Security Center?

Japan's Quake-Tsunami March 2011

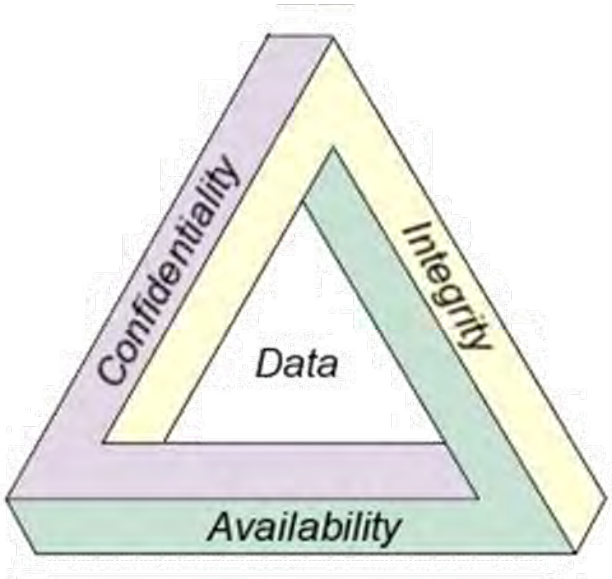
Moving the Enterprise Network to a cloud environment

- Each node mirrors each other
- Node selection is base on network load
- Network management and services virtualized.
- Increased operating cost
- Offset by using limited resources to focus on operations, not on support
- Sites only have local labor to repair equipment.
- No local IT staff.

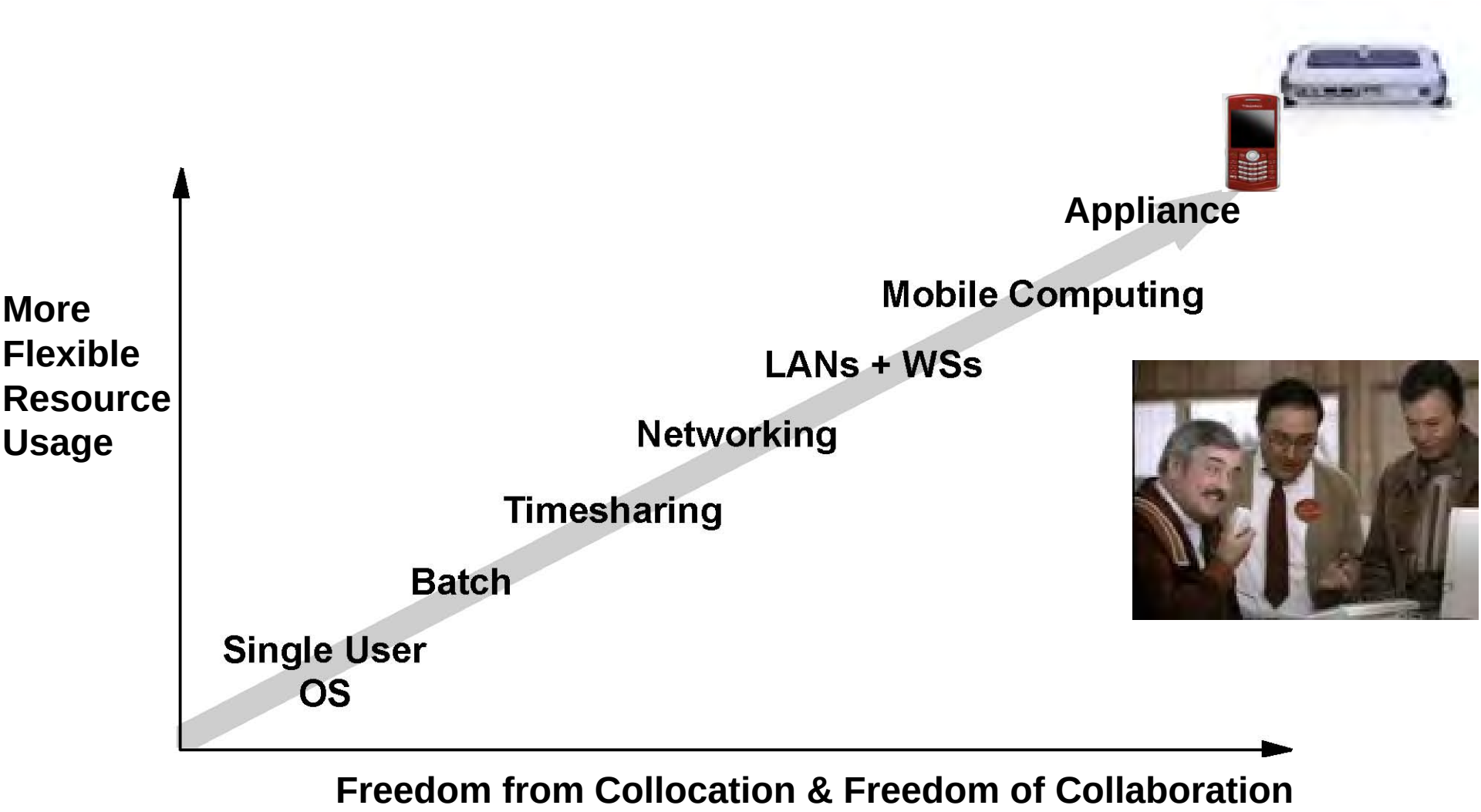


Integrity and Availability

- Frequent network failures common
- Security takes computational time
- Autonomous operation is desirable
  - Caching and Syncing
- Asynchronous & spool-oriented application desirable
  - Mail, Printing, Web browsing
- Need disconnected file systems
- Need to be able to handle heterogeneous networks and heterogeneous computers



Natural Evolution of Computing



Convergence

- **Cloud – Core Technology**
- **Virtual – Enabling Technology**
- **AI Computer Security -- Enabling Technology**
- **Desktop Appliance – Thin Client, with no or limited permanent storage**
- **Computing as a tool – you won't even know you are using a computer**
- **Data Management**
- **Knowledge Management**
- **Skynet??**

Personal Computing is Dead

..and it has been for years

When is the last time you really only used YOUR PC and ONLY YOUR RESOURCES????

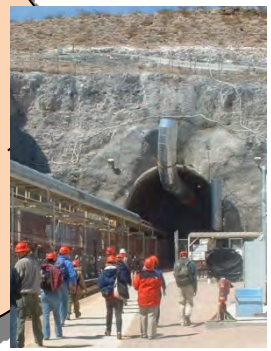
It died – and you never even noticed!!!!

DoD Hardened Nodes

Build a Hardened Cloud supporting all DoD assists

Start with SIPR

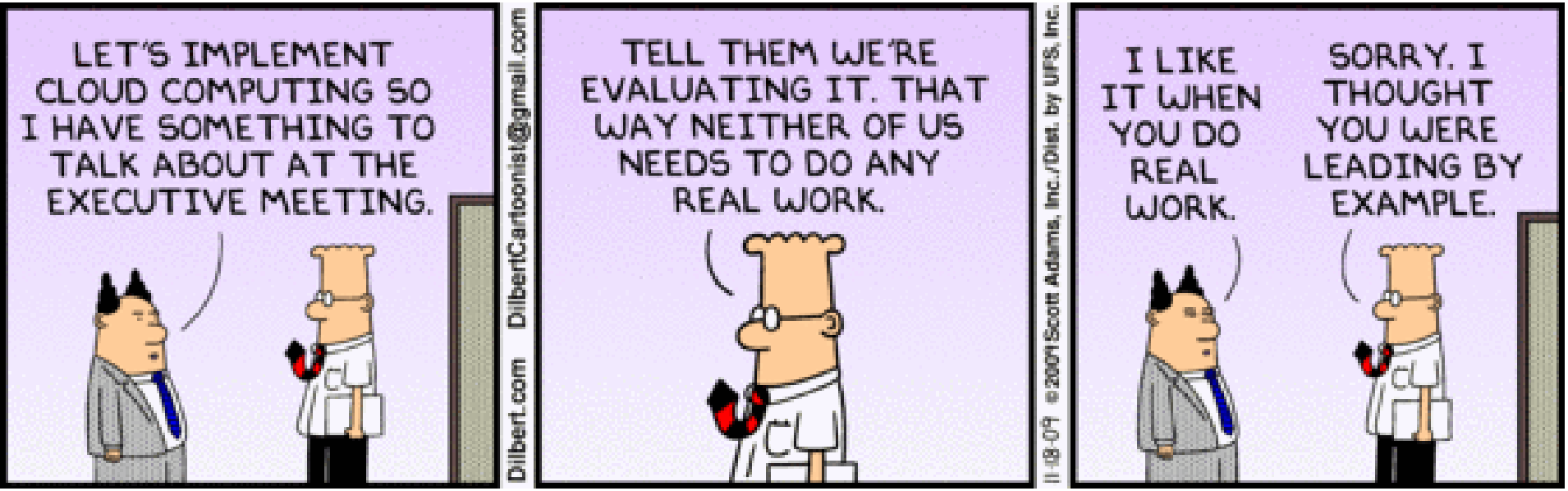
Cheyenne Mountain Complex



Salt Caves Nevada

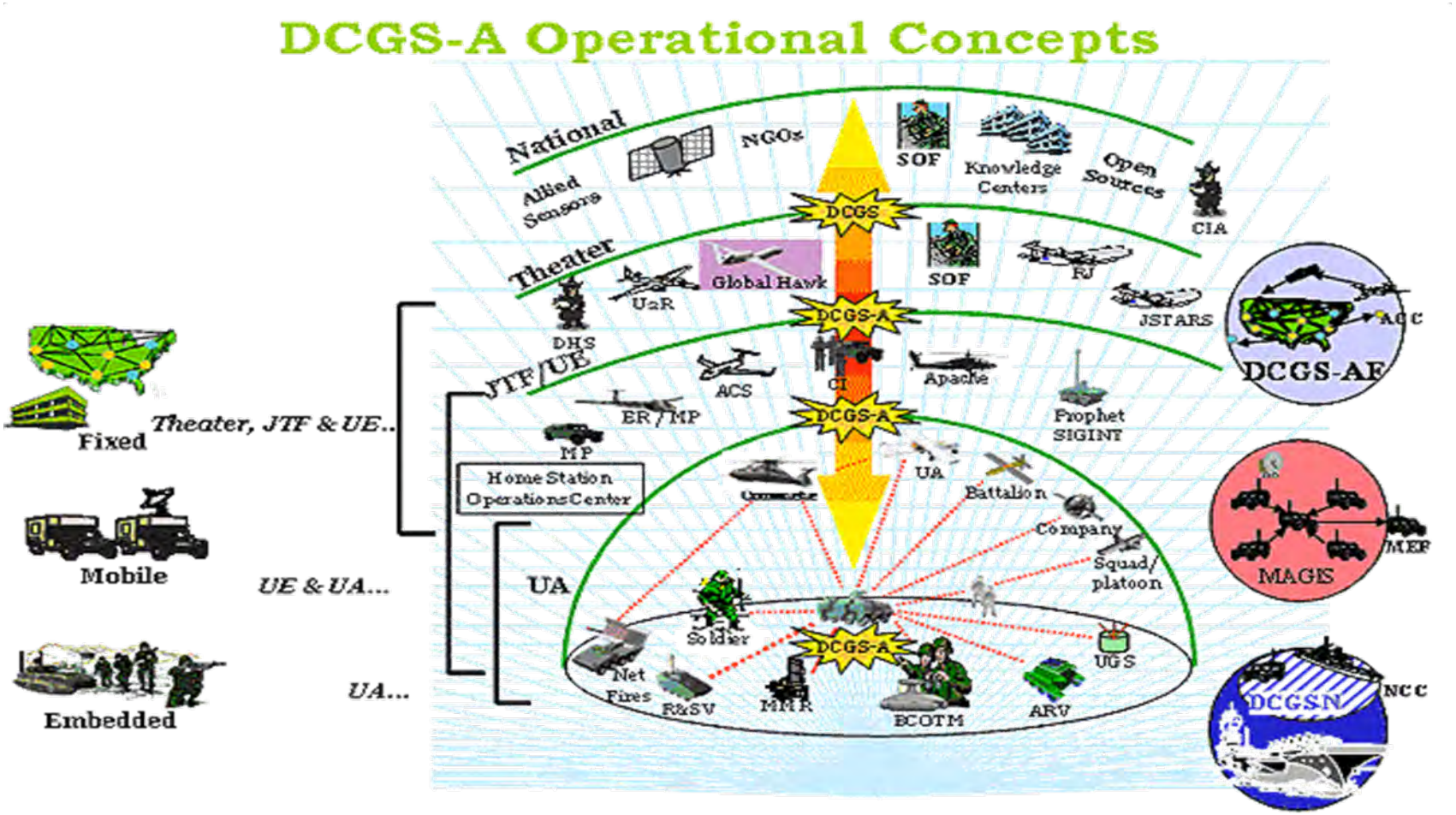
To Sum it up

- Know what you need
- Remember CIA
- Be Proactive, not Reactive. Plan for the future, because it's coming full speed!



Army Deploys First DoD Tactical Cloud Computing Node

Apr. 4 2011 Col. Charles Wells, project manager of the Distributed Common Ground System-Army (DCGS-A), told Defense Systems magazine today that DCGS-A Version 3 represents the Defense Department's first tactical cloud computing node. Called the Griffin software build, this capability is in response to a joint urgent operational need from Army Maj. Gen. Michael Flynn.



Mahalo
and
All y'all have a good day!

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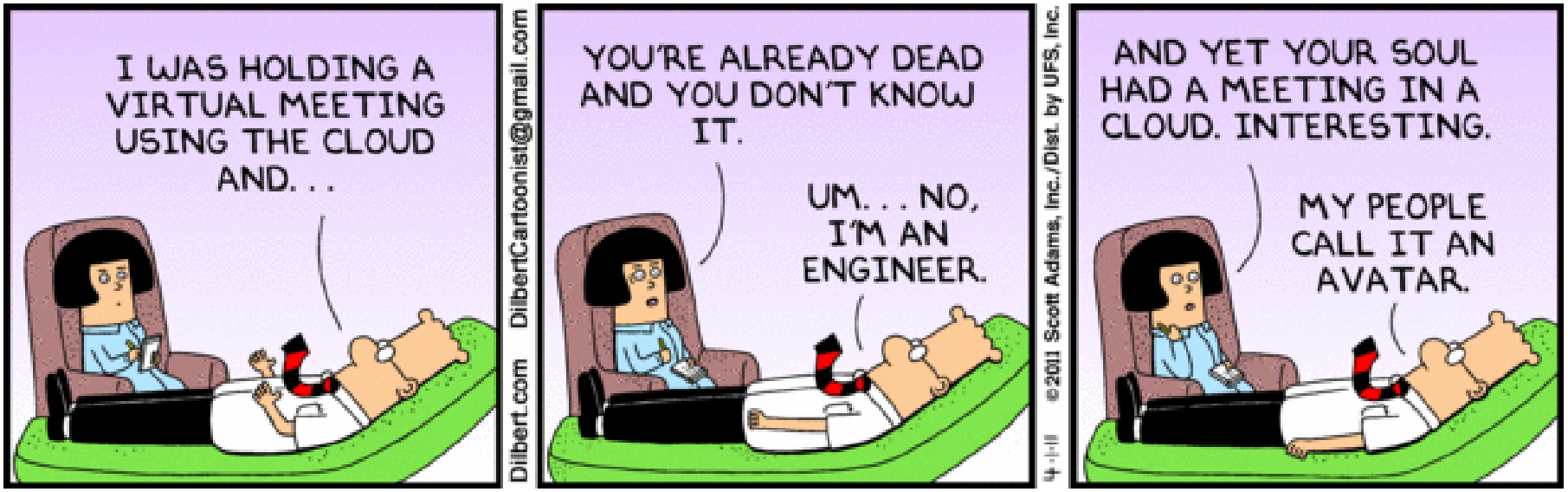

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